# TEMPERATURE

IN

# ACUTE DISEASE.

BEING

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BY

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# TEMPERATURE IN ACUTE DISEASE.

## PART I. — ON THE PRACTICAL VALUE OF ACCURATE DAILY OBSERVATIONS OF THE TEMPERATURE OF THE BODY IN ACUTE DISEASE.

In the following article I desire rather to assist, however slightly, in the more thorough investigation of a subject to which the attention of the profession has been lately directed, than to aim at any elaborate dissertation.

I propose, therefore, to bring forward, in a crude form, and as a simple independent testimony of certain facts, the results of my own experience, without reference to the statements of previous observers.

I cannot, however, here forbear mentioning how much we are indebted to Professor Wunderlich, of Leipsic, for his indefatigable labours with the clinical thermometer, nor can I altogether pass over without notice the admirable articles on this subject by Dr. Aitken and Dr. Sydney Ringer.

I shall not attempt to discuss the several theories of the production of animal heat, normal or abnormal, but will merely remark, that I have not, myself, found the actual excess of temperature, in typhus fever, to be proportional, as some assert, to the amount of urea excreted daily, and consequently am inclined to think that abnormal temperatures at any rate are not altogether due to tissue metamorphosis. My observations, however, on this matter, have not been sufficiently numerous to be of much value.

My object in taking up the study of temperatures has been mainly with a view to test their practical value for general use in

ordinary practice, and consequently my observations have (with some few exceptions) been taken only once daily, but always as near to the same hour as possible. It would, no doubt, have been more advantageous had several observations been taken during the day at stated hours; but if the value of thermometric registrations generally depends only on a frequent observation of the temperature during the day, a thermometer would necessarily be of little use in private practice. I have, therefore, preferred to register one observation only daily, viz., about 2 p.m., at the same time noting down the state of the pulse, skin, respirations, and general symptoms.[a]

The observations have been, without exception, made in the axilla, the superiority of this situation to that of any other being generally accepted, on account of the nearer approximation of its temperature to that of the blood in the vessels.

The general conclusions which I have come to, up to the present time, have been arrived at after a careful study of some 125 cases taken by myself during the last two years, at St. Bartholomew's Hospital, and also of some seventy-five other cases taken in the same hospital, during the same period, by Dr. Warter, a careful and accurate observer, to whom I am much indebted for the opportunity of using such valuable material.

I should here mention that during the past six months, the temperature of every case of acute disease, coming into the medical wards of the hospital, has been taken either by Dr. Warter or myself.

The total number of cases, then, in which the temperature and general symptoms have been watched and recorded daily throughout their course, amounts to 200, of which sixty are typhus, thirty typhoid, twenty pneumonia, fifteen scarlet fever, and the remaining seventy-five comprise cases of febricula, acute rheumatism, erysipelas, chorea, acute tuberculosis, &c. The total number of observations in these cases, and in others in which only one temperature has been recorded by Dr. Warter or myself, probably exceeds 5,000.

As I shall have to speak of normal and abnormal temperatures, it

[a] Generally we shall find that a registration at 2, p.m., is about the mean between one taken at 9, a.m. (when the temperature is nearly at its minimum) and one at 9, p.m. (when it is not far from its maximum). In the majority of acute diseases I think that the difference between these two extremes may for practical purposes be approximately placed at 2° Fah. Consequently, if we wish to compare the condition of a patient as to temperature with his state on a preceding day, we must be careful to take into account the hour of our visits.

will be necessary for me to state what I consider to be approximately the average normal temperature of an axilla in a healthy adult. A temperature of 98·4 Fah. is the point generally settled upon by the majority of authorities on the subject; but this, I believe, to be too high, as although I have not at present taken a sufficiently large number to decide the question to my own satisfaction (which I hope, however, shortly to be able to do), yet I can state that I have very rarely found such a temperature present in a healthy adult under normal conditions. I have every reason to think such a temperature to be nearly up to the maximum, consistent with health, and to be only met with occasionally, just as one comes across, now and then, a healthy adult with a temperature below 96° Fah. I consider the healthy range to be somewhere between 95°·5 and 98°·5 Fah., the most common temperature met with, being probably 97°·4 Fah., *i. e.*, one degree less than the temperature hitherto most generally received as the normal one.

The following then are the propositions I wish to establish:—

1st. That a continued daily temperature of 99° Fah., and upwards, indicates an unhealthy condition, and occurs in every case of acute disease. As I have never met with one case in which such a temperature was present, under normal conditions, in a healthy adult, and as every case of the 200 taken exhibits this state of temperature, the proposition may be considered to be proved.

2nd. That any one observation of a very high temperature (such as 105° Fah.), in any case in which the general symptoms do not appear of any particular severity, should lead to a very attentive re-examination, and suggest a very careful watching, especially if occurring in a non-diagnosed case; such a temperature being present only in severe forms of any disease.

In support of this I will mention the following case:—

W. B., aged twenty-nine, a well-nourished man, of rather sallow complexion, somewhat excited manner, having an occasional spasmodic way of speaking, complained, on admission, of sore throat, and on examination, both tonsils and the back of the pharynx, were seen to be considerably inflamed. He gave an imperfect history of having been ill about a week. This, at first sight, seemed to be merely a somewhat severe case of tonsillitis, and no further very minute examination, by the physician in charge, appeared to be immediately necessary. The case was therefore left for the history, &c., to be made out by the clinical clerk, before the visit next day, as is usual in such cases. Finding, however, the man's temperature

to be 105°·4 Fah., I was interested in the ease; and I made out, on further examination, the existenee of partial trismus, and that the tongue, when protruded, deviated slightly towards the right side. Having mentioned this state of things to the physieian, he returned again on purpose to see the ease, when he found the symptoms still more severe, and eonsidered the prognosis very unfavourable.

This man, morever, died on the next day, some twelve hours after admission, the ease being one of septieæmia.

Another equally important ease of eerebro-spinal meningitis, in a girl of eighteen, was thought by many who saw it on admission, to be one of hysteria; but here a temperature of 103°·5 Fah. was quite suffieient to negative sueh an idea.

This ease also terminated fatally.

3rd. That the thermometer is of great use, as a means of diagnosis in those eases, which frequently present themselves, of general *malaise*, often aeeompanied by a history of rigors, loss of sleep, &e.; sueh symptoms being due either to the eommencement of some aeute disease, or merely to some gastrie or uterine disturbanee of a temporary eharaeter.

In these eases it is often at first impossible to deeide, judging only from the pulse and general symptoms; but if the state of the patient be due to the more serious ause, we shall invariably find an abnormal temperature; and on the other hand if due to any other, a normal temperature, will be often met with, frequently aeeompanied by a very rapid pulse. I have never met with one ease in whieh, the temperature being normal, any aeute disease afterwards developed itself, and although I have nearly twenty examples of this proposition, I will only bring forward one.

E. J., aged twenty-four, a nurse in a ward in whieh there were several eases of typhus and typhoid fevers, is a well nourished and generally healthy woman. The cheeks are flushed, eonjunetivæ slightly suffused, tongue eovered with thin fur, and inelined to dry; the bowels have been loose the last three days, and were open five times yesterday. She eomplains of frontal headache, pains in all her limbs, want of sleep, loss of appetite, &e. Has not felt quite well for about a week, but eontinued at her work until yesterday. She "felt very eold all over" three days ago, and sat over the fire, but eould not get warm. Her pulse is 72; temperature, 97° Fah. The next day, and the day after, she exhibited mueh the same symptoms; her pulse, however, going up to 120 and 100 on the two days respeetively, whilst the temperature remained steady

between 96° and 97° Fah. Two days afterwards she was quite convalescent, and about the ward again. This case bore as strong a resemblance to that of an early stage of typhoid fever as it was possible to do, and for the first few days many considered it to be one of this disease.

A point of great interest in connexion with this case was the fact that some three months afterwards the patient had well marked typhus fever, with a temperature of 103° Fah., and a pulse of 120 on the fifth day, which was the first time I had an opportunity of seeing her on this occasion.

4th. That the temperature in every disease has a tendency to run a peculiar course, and has a certain range of altitude, a knowledge of which course and range is of great value as an assistance to us in diagnosis and prognosis.

In connexion with this proposition I should observe that I have not found the temperature in acute disease to be perceptibly affected by the season of the year at which the disease may have occurred, although the temperature of the wards during the year has varied to a considerable extent.

Again, if cases of similar severity at different ages be compared, the altitude attained by the temperature in any disease does not appear to be influenced by the age of the patient, although "the normal" is generally reached somewhat earlier in children than adults.

I have drawn up some charts to show the course of temperature as observed by myself in typhus, typhoid, and scarlet fevers, pneumonia, acute rheumatism, erysipelas, and tonsillitis.

These diagrams are not founded on any average, but merely represent actual typical cases. I have preferred to adopt this plan on account of the fallacies likely to exist in such tables if drawn up from averages. Errors in establishing the exact day of the disease are, in many cases, unavoidable; but these, although only to the extent of a single day, might considerably affect the ultimate result in any general average.—(For Diagrams see pp. 23–31.)

Having discussed typhus and typhoid at some length in another paper I shall not further allude to them. To the other diseases (the course of temperature in which I have endeavoured to illustrate by diagrams) I will briefly refer.

In pneumonia we have high temperatures as early as the second day, with the maximum generally on the third or fourth, and a sudden fall (of perhaps 5° Fah.) to normal on the seventh or eighth.—(See Diagram I.)

If this fall does not take place before the tenth day, we may be tolerably certain that the case is not one of simple pure pneumonia, but that it is probably complicated with tuberculosis, or connected with typhoid fever, rheumatism, &c.

In acute rheumatism we have a long-continued slightly abnormal temperature, generally ranging between 99° and 102° Fah., and very rarely reaching 103° Fah.—(See Diagram II.)

Erysipelas is characterized by very sudden changes of temperature; thus, we often get an alteration of 4° or 5° Fah. in twenty-four hours, and occasionally a fall of 7° or 8° Fah. in the same period. I have observed in several cases that a considerable fall has taken place immediately on the appearance of the characteristic redness.—(See Diagram III.)

The temperature of tonsillitis is especially interesting when compared with that of scarlet fever; and as the diagnosis in the early stage between the two is often doubtful, we may frequently be much assisted by the observation of the temperature.—(See Diagrams IV. and V.)

In tonsillitis the temperature in the middle of the day, when at its maximum, which is generally attained about the fourth day, rarely exceeds 100°·5 Fah.; and this occurs with a pulse often below 100. Normal is reached about the sixth or seventh days.

In scarlet fever, on the other hand, the maximum is arrived at about the third day, when the temperature is generally 104° Fah., whilst the pulse is considerably above 100. The normal is not usually attained until the tenth or twelfth days.

Generally a high temperature, such as 102° Fah., when met with on the second day of *malaise*, will be found to denote a case of scarlet fever, febricula, or pneumonia.

Although I have taken a few cases of many other diseases besides those just mentioned, yet I have preferred, at the present time, to confine myself to the examination of the course of temperature in these seven only, considering that my experience of this subject in any other disease has not at present been sufficient for me to judge fairly of it. I would, however, just allude to the possibility of temperature being of great assistance to us as a means of diagnosis between typhus fever with severe cerebral disturbance (when occurring without any rash), and purely cerebral cases of meningitis or cerebritis. I have only had an opportunity of taking the temperature of two purely cerebral cases, but in both of these the temperature rarely exceeded 101° Fah., whereas with similar

symptoms due to typhus fever, we might have expected the thermometer to stand some 3° higher.

I should also state that the highest temperature I have ever taken was 107°·2 Fah., and occurred in a case of pneumonia following tracheotomy; the next highest was 106°·2 Fah., in erysipelas; generally, however, temperatures above 105° Fah. have been rarely met with.

I will conclude this part of the subject by bringing forward a case to prove the value of a knowledge of the course and range of temperature in different diseases.

A boy of fifteen was admitted with general *malaise* and sore throat. His tonsils and the back of his pharynx were somewhat inflamed, but his tongue was moist and nearly clean.

After the first few days he complained of nothing except weakness, although his voice continued very husky. His appetite remained pretty good throughout, and he slept well. About the fifteenth day he had some bronchitis, and on the sixteenth some hemorrhage, with a loose motion; previously his bowels had been somewhat confined. The hemorrhage did not recur. There was never any rash or abdominal tenderness, and the physician in charge of the ward considered the patient's illness to be due to the apparent symptoms manifested, viz., the sore throat, with probably some laryngeal mischief, and the thoracic complication.

The course of temperature was that of typhoid fever throughout; and at the time I mentioned this fact to several who were interested in the case, but I little expected to be afforded any corroboration of my statement, as the lad's temperature fell to normal on the twenty-eighth day; and two days after this he was up and about the ward.

However, as the case was not considered to have been one of typhoid fever, there was no especial necessity to be careful with his diet, and he was placed on meat diet. Having a very hearty appetite he did good justice to the food allowed him, besides partaking of some extras which were surreptitiously conveyed to him by his friends. The consequence was, to use his own expression, he went to bed "feeling very well," but "very full." Some hours afterwards symptoms of colic came on, which, not being relieved by the appropriate measures adopted, were followed by those of peritonitis of which the lad died on the seventh day from his seizure.

The *post mortem* disclosed a quantity of purulent fluid in the peritoneum, and numerous ulcers of Peyer's glands, the majority of which had already cicatrized, but in many the healing process

was still going on. The peritonitis had been caused by an overloaded intestine, previously weakened, the colon being completely stuffed with scybala. There was no perforation.

5th. From the last proposition it follows, that the same altitude of the thermometer attained at one period of any disease is not of the same importance as the same height reached at another time in the same disease.

Thus, in typhoid fever, a temperature which has been rising for two or three days, reaches perhaps 104 Fah. between the seventh and fourteenth days, without causing any anxiety; whereas should the same phenomenon occur about the twenty-eighth day, a fatal termination might probably be expected.

And again, the actual altitude attained on a certain day in one disease is not of the same importance to our prognosis as the same height reached on the same day in another disease. Thus, a temperature of 104° Fah. in erysipelas is very common during the first week, and need not give rise to any alarm; but should such occur at the same date in acute rheumatism I should consider it of much more importance.

6th. That although, in all diseases, a high range of temperature generally indicates a severe case, with a slow convalescence, and a low range usually occurs in a mild case, and is followed by a rapid convalescence; yet there is no actual temperature in any disease which necessarily foretells a fatal termination. Thus I have registered 105°·6 Fah. in a severe case of typhus ending favourably, 106°·3 Fah. in erysipelas, 105°·3 in typhoid; and each of these temperatures was the highest I ever took in the respective diseases.

I certainly once registered a temperature of 107°·2 Fah., in a fatal case of pneumonia; but the great majority of fatal cases generally, although always exhibiting abnormal temperatures prior to collapse, have by no means had any extraordinarily high ranges. I believe that an abnormal course of temperature is more often the precursor of a fatal termination than any universally high range.

7th. That in the majority of cases a rise of temperature is contemporary with a rise of pulse, but that on the other hand there appears generally to be but little connexion between temperature and frequency of respirations.

The alteration in the pulse with a change of temperature is often not a proportioual one, and may not take place at all unless the variation of temperature be as much as 2° Fah.

Cases of typhus fever are, perhaps, the best examples of the simultaneous alteration of pulse and temperature.—(See Part II., p. 16.)

The latter part of this proposition does not hold good in cases of pneumonia, as in this disease (which I have found to differ from all others in this respect) the temperature and the number of respirations fluctuate together very regularly.

8th. That where the temperature and pulse together do not coincide with the general symptoms, the two former may be generally relied on as to the actual state.

Thus, in typhus, towards its close, we often get a continuous fall of temperature and pulse for perhaps three or four days before there is any improvement in the general symptoms; and in these cases the two former always foretel rightly.—(See Part II., p. 21.)

There is, however, a well marked exception to this rule in the later stages of typhoid fever, as mentioned in Part II.

9th. That where the temperature and general symptoms agree together, but do not coincide with the state of the pulse, the two former may generally be relied on as to the actual state.

Thus in cases of hysteria, and in cases of excitable persons approaching convalescence after fever, we often suddenly get a very high pulse, which is sometimes continuous for days, although the temperature and general symptoms are neither of them adverse.

10th. That in those cases in which the pulse and general symptoms remain the same, a moderate fall of temperature on one occasion is not to be relied on; but should such a fall continue in a moderate and gradual manner, for some days, and at such a period when a fall was to have been expected, the temperature may then be depended upon. Severe cases of typhus, towards their close, often give examples of this sort.

In those cases, however, in which the pulse continues frequent, and the general symptoms are severe and without improvement, a considerable fall of temperature (say 5° or 6° Fah.) is to be regarded with anxiety, being probably due to some internal hemorrhage, or to the commencement of a state of collapse.

Thus in a case of icterus, in a girl of fifteen, due to obstruction of the common duct by a hydatid cyst, and accompanied by peritonitis, on the three days preceding death, the pulse had stood at 140, 140, and 136 respectively, the temperature having been on the same days 104°·2, 104°·5, and 99° Fah.; whilst the general symptoms continued without alteration. Here, on the last day, we

got a sudden fall of 5½° Fah., which was the first sign of collapse terminating in death some twenty-four hours afterwards.

Again, in a case of typhoid fever, on the seventeenth day there was a sudden fall of 4° Fah. from the preceding day in consequence of considerable internal hemorrhage.

11th. That in those cases in which the pulse and general symptoms continue the same, being the one frequent and the other severe, a continuous rise of temperature for some days, occurring at a period of disease at which some improvement might generally be expected, is usually the precursor of a fatal termination.

Thus, in a case of typhoid fever, terminating fatally on the thirty-sixth day, the pulse and general symptoms continued without change until the thirty-fifth day; the former having stood at 92 on the twenty-ninth day, remained steady and rather below that frequency until the thirty-fifth day, when it suddenly rose to 124. The temperature, however, rose continuously from the twenty-ninth day, nearly a degree a day, until it stood 5° higher on the thirty-fifth than on the twenty-ninth day—the height registered on the thirty-fifth day being 104° Fah.

12th. That although it is possible that the state of the temperature alone in acute disease may, perhaps, hereafter prove to be the one safest symptom to rely upon if taken by it itself (and I believe it is at present, at least, equal to the state of the pulse, and of greater value than this certainly, if only its frequency be taken into account), yet the temperature must be considered merely as an aid, and all other symptoms must be carefully examined into, as it is on comparison with these that its greatest value is always to be found.

The preceding propositions, which are not intended to be put forward as dogmatic rules, being merely the result of a very limited experience, and being probably only approximations to the real truth, which is always deep down "at the bottom of a well," imperfect though they be, nevertheless contain, I think, amply sufficient to prove the great value of the daily observation of the temperature in acute disease.

I will now refer to those who disregard the value of the clinical thermometer, and amongst these are many of high authority, whose opinion is entitled to great consideration.

What, then, is the reason of the disregard of such? 1st. Some do so because they allege that they can sufficiently distinguish by their hands normal and abnormal states of temperature, and can

carry such sensations in their minds, or commit them to paper under such expressions as "cool," "moderately cool," "warm," "hot," "very hot," "pungently hot," &c.

The fallacy of these expressions can, however, be easily ascertained by any one who will take the trouble, in a few acute cases, first to write down his sensations, and then take the temperature by a thermometer.

Heat and cold are only comparative temperature sensations, and as our hands vary considerably in their temperature, it follows that a body submitted to a hand, the temperature of which is 95° Fah., will refer to the mind a very different sensation to that which it would do were the temperature of the hand 10° or 20° lower.

As an example of this fallacy, I will only mention the following fact:—

I have heard a physician of high standing observe that the skin of a patient was "moderately cool," when the actual temperature in the axilla was 104° Fah.! This is by no means an uncommon occurrence.

2nd. There are some authorities who state that an abnormal temperature generally does not occur at all in cases of acute fever, and on this account undervalue the thermometer.

I can, however, honestly state that I have never met with one such case, neither have I found any one who has used a thermometer who has done so, except the patient were in a state of collapse just prior to death.

Consequently, with all due deference to such authorities and their statements, I am strongly inclined to think that the actual existence of such cases is more than doubtful; and if the temperature of a patient which is really 104° Fah. can be called "moderately cool," it will not be difficult to understand how such cases have been supposed to occur.

3rd. There are others, again, who disregard the value of the thermometer because they think they have tried it and found it wanting.

These have tried it certainly, according to their own manner, but generally with utterly wrong and probably self-conceived ideas as to its use. They have started on their trial with the belief that the abstract degree of heat was all that they had to consider. Such as these, consequently, soon find out that a thermometer will lead them into all sorts of blunders, and properly discard it. But would these be merely content with considering the height of frequency to which the pulse had attained, without taking into account its

volume, rhythm, its condition yesterday, the disease and the individual in whom it occurred?

Well, then, some very similar conditions must also be considered before placing an actual value on any one observation of temperature—thus, the disease, its period, its height yesterday, &c.; and without reflection on these points, the observation will be useless indeed.

It would, no doubt, save a great deal of trouble if we could decide our prognosis and diagnosis by means of the temperature alone, and also without any practice or experience in the use of the clinical thermometer; but would any one discard the stethoscope merely because some experience in its use was required before any one could be in a position to place a value on the sounds he might hear, or because, even after considerable practice, the value of some sounds (such as certain cardiac murmurs) still remained doubtful?

In the same manner, a person must have some amount of practice with the thermometer before he is in a fit position to put an actual value on any one observation; and any error in diagnosis or prognosis which a beginner may make will be due probably to this wrong interpretation of a certain fact.

The greater his experience the less will be the chance of such an error, and the more valuable will his thermometer be to him.

I will just give two examples of numerous mistakes liable to be made by this class of objectors.

A case of febricula presents itself, and a very high temperature is found within a few hours of the first symptom of *malaise*. The observer in question necessarily thinks that his patient must be suffering from a very severe form of fever, probably typhus, and is proportionally anxious, but in forty-eight hours perhaps, to his delight and astonishment, the temperature is again normal, and the patient convalescent. Such an observer, having considered only the abstract degree of heat, immediately discards his thermometer, although his error of diagnosis and prognosis was due to the wrong interpretation of a fact. Had his experience been greater, the very fact which so alarmed him would have had probably an exactly opposite effect, for he would have known that the disease could not at any rate be typhus fever.

Again, to take an opposite example.

In a case of typhoid fever, in which the general symptoms are severe, the temperature, which has been fluctuating about 103°

Fah., suddenly drops 4° or 5° without any improvement in the general condition of the patient.

Such observers, considering only the abstract degree of heat, regard the altered state of temperature as a favourable sign, and are surprised at, very possibly, finding the patient dead on their next visit. Had they had more experience, they would have known that such a fall was a very unfavourable symptom under the circumstances, being probably caused by intestinal hemorrhage, or else being the commencement of a state of collapse; as in typhoid fever, the general symptoms improve considerably before the temperature reaches normal. All the blame of such unfortunate prognoses is, of course, laid on the thermometer, instead of on their own ignorance and rash judgment.

The above are examples of the misuse of the instrument, in the use of which we must always be very careful not to jump at conclusions, but strive honestly to arrive at the proper interpretation of the additional fact which we have just registered; by so doing we shall, by its assistance, reap an abundant reward in a more successful diagnosis—a more confident prognosis.

In conclusion, I am convinced that the study of the thermometry of disease is as yet in its infancy; and believing that such a study, instead of teaching any disregard for the pulse, or other important symptoms (as some have wrongly supposed it was intended to do), will further enhance their value, and generally conduce to a more attentive examination of each symptom manifested in acute disease, I consider the subject to be one well worthy the attention of every member of our noble profession, and one which will amply repay the few extra moments spent at the bedside.

## II.—A CONSIDERATION OF THE COURSE OF TEMPERATURE AND PULSE IN TYPHUS AND TYPHOID FEVERS, AND SOME OF THE POINTS OF DIFFERENCE BETWEEN THESE TWO FEVERS SHOWN THEREBY.

The cases from which the following data were ascertained occurred in St. Bartholomew's Hospital during the last two years, and daily observations were taken of them either by Dr. Warter or myself.

The number of cases amounts to sixty of typhus and thirty of typhoid fever.

I should here state that in the great majority of these cases only one observation daily was recorded, but always as near to the same hour (viz., 2, p.m.) as possible.

In consequence of this fact I shall not be able in the present paper to compare the morning and evening temperatures of the two diseases, but will now merely remark, that although the differences between the morning and evening temperatures of typhoid seem to be greater than between those of typhus fever, yet the altitude attained by the thermometer at 2 p.m. has in both diseases appeared to be nearly the mean, between an observation taken at 9 a.m. and one at 9 p.m. I have, however, not had sufficient experience on this particular point to speak with confidence on the subject. I propose in the first place to consider typhus and typhoid fevers separately, and then to examine their points of difference.

Typhus, as met with under the above-mentioned circumstances, seems to occur generally in two forms:—1st. The milder form, the subjects of which are children, or previously healthy adults under thirty, who have led sober and regular lives; 2nd. The more severe form, which has been the one somewhat the more frequently met with. This has occurred either in persons of a more advanced age or in younger adults of unsound condition from previous disease, or in consequence of intemperate habits.

In both of these forms the temperature, having attained its maximum (usually on the seventh or eighth days), falls continuously until the tenth or eleventh days, and in mild cases this decline (which amounts to about one degree Fah. per diem) continues until "the normal" is arrived at.—(See Diagrams VI., VII., VIII., and IX.)

In the more severe class of cases, however, there is a secondary rise of temperature, which occurs about the eleventh day, and continues for two or three days, when the regular characteristic daily decline to "normal" commences. This decline exactly resembles the one which takes place in cases of the milder form.

In the majority of cases in which this secondary rise has been observed, a considerable and manifest thoracic complication has been present, but in several none could be detected, either by auscultation or physical signs.

In cases of either form the temperature will not again exceed the normal one, after this point has been once attained, unless some fresh complication be at hand.

In all cases, also, of this fever there is a very uniform temperature of about 104° Fah. on the seventh day; with this exception there is no temperature peculiar to any one day.

In the milder form of the disease the pupils are seldom contracted; the tongue, although generally thickly coated, never exhibits the dry, brownish-black fur of the more severe type; subsultus is not often, floccitatio very rarely present; the delirium (which occurs only at night) is slight, and the rash is not usually very copious. In such the general range of temperature is comparatively low, the termination of the case is, without exception, favourable; and the convalescence, which may be said to begin about the fourteenth day, is rapid.

The temperature attains its maximum on the seventh or eighth days, the average maximum being 103°·7 Fah., the highest registered 104°·3, and lowest maximum 102°. "The normal" is reached on the twelfth or thirteenth days.

In the more severe form we often find contracted pupils, a dry, brownish-black tongue, with sordes on lips and teeth, great subsultus and muscular tremors, often floccitatio, delirium frequently present by day as well as night; and towards the termination of the case, a semi-comatose condition often comes on, which occasionally alternates with severe delirium at night. The rash in these cases is generally copious. Under this form I include those exceptional cases of typhus which are attended by considerable diarrhea; these occur in about ten per cent. of all cases, and do not in any other respect differ from ordinary severe cases of the fever.

In the severe form, then, the range of temperature is high, the termination not always favourable, and the convalescence, which does not begin until the end of the third week, is very tedious.

In these cases the maximum temperature is attained between the seventh and tenth days (generally on the seventh or eighth), the average maximum is 104°·4 Fah., highest registered 105°·6 Fah., lowest maximum 103°. "The normal" is reached between the fifteenth and eighteenth days, both inclusive.

High temperatures, such as 105° Fah. and upwards, do not foretel fatal terminations; but high ranges, generally, at the commencement of cases foreshow severe attacks, and are invariably followed by long convalescences. Fatal cases always exhibit abnormal temperatures prior to collapse, but not necessarily very high ones. Judging from the fatal cases I have witnessed, I believe that an abnormal course of temperature much more generally precedes a fatal termination than any unusually high range.

Such cases have appeared to differ from the ordinary run of severe

attaeks terminating favourably in one or more of the following ways:—

1st. They exhibit a temperature of only 102° or 103° Fah. about the sixth day, whieh is below that generally met with even in mild eases; and eonsidering the severity of the symptoms we should expeet to find a temperature nearly 2° higher at sueh a date.

2nd. They have a eonstant temperature of about 102° Fah. for a week or more.

3rd. They exhibit a fall of perhaps 3 or 4° Fah. on some day on whieh, in an ordinary severe ease, we should not expeet any sueh fall (say on the tenth day).

4th. They have a temperature of about 104° Fah. as late as the sixteenth day, when even in severe eases "the normal" ought to be nearly reaehed.

The pulse generally in typhus rises and falls with the temperature; and between the fourth and ninth days is above 100, often very eonsiderably so; its maximum is reaehed rather later than the temperature, and "normal" is attained some two or three days after this point of temperature has been arrived at.

It may, however, espeeially in persons of nervous temperament, be kept up beyond this date.

In typhus a temperature of 99°·5 Fah. generally oeeurs with a pulse of about 100, a temperature of 100°·5 Fah. with a pulse of 105 and so on; an alteration of about five beats in the pulse eorresponding to eaeh degree of alteration in the temperature.

In the majority of eases, however, unless the alteration of temperature be upwards of one degree, we shall find, probably, no eorresponding inerement or deerement in the pulse, and the above only holds good in a general sense.

I have, however, noted down eaeh variation of 2° Fah. and upwards whieh oeeurred during the eourse of the sixty eases of typhus, in order to aseertain the eontemporary behaviour of the pulse. I find that as a rule every such fluetuation in the temperature was attended by a eorresponding alteration in the pulse, and that this ehange amounted on an average to five beats for each degree. There were only five exeeptions to this rule out of the whole number, and in two of these the variation in pulse oeeurred on the next day, without any further alteration in the temperature.

In eoneluding these observations on typhus fever I should mention that by far the most frequent eomplieation in these eases was bronehitis, eoming on about the twelfth day.

Considerable feebleness of the cardiac systole and impulse was also noticed in several instances, and this phenomenon was occasionally observed for a considerable time after convalescence had commenced.

The fatal cases amounted to about twelve per cent., and occurred either within the first week or else between the twelfth and sixteenth days.

In the former case the deaths seemed to be due to the intensity of the fever poison itself, and in the latter to the circulation in the system of the products of tissue metamorphosis. In only one case, however, were typical uremic convulsions observed. These fatal cases occurred in patients over 40, or in adults above 25 who had led irregular lives. The proportion of male to female deaths in the same number of cases was 7 to 5.

At the *post mortem* examinations of these cases ulceration of Peyer's glands was never present, and the only peculiar appearance noticed was a dark fluid condition of the blood, and occasionally a dark and abnormally dry condition of the muscles. In one case there was a remarkable effusion of semi-coagulated blood into the substance of the recti muscles of the abdomen. The enlarged congested liver and large soft pulpy spleen have been met with both in typhus and typhoid.

I will now proceed with the consideration of typhoid fever, which has been met with under two forms of such unequal severity, that I propose for convenience sake to divide the cases as I have done those of typhus, into two classes; one comprising the milder, the other the more severe form.

I should, however, observe that although a severe case of typhus may often be foretold at an early period, yet it is impossible to do so at a similar date in typhoid fever; as I have observed several in which the mildness of the symptoms during the first week or ten days might have augured an early convalescence, eventually turn out of the most protracted character.

In typhoid fever then the temperature generally rises, after numerous daily fluctuations, to its maximum; and having attained this point exhibits the same characteristic irregular decline, falling perhaps for two or three consecutive days, and then rising again for two or three more, and so on; the fall, however, preponderating over the rise, until the normal is reached, after which daily fluctuations will probably continue for a few days longer. The majority of cases come under the first mentioned form, ultimately proving of

moderate severity, and terminate favourably towards the end of the third week.

In these the pupils are slightly dilated; the tongue, although inclined to dry, and generally abnormally red at the tip and edges, often continues nearly clean throughout. A very common form of tongue which I have observed in such cases has a rather dryish patch, in the form of an isosceles triangle (the base of which is at the tip), running up the centre, with two moist strips of thin white fur on either side. Subsultus and tremors in these cases are rare, and delirium (as often absent as present) is usually very slight, and comes on during the night only. Intestinal hemorrhage does not occur, and thoracic complications of importance are rare.

In these the temperature attains its maximum between the seventh and eleventh days (but this is not reached more frequently on one day than on another); the average maximum is 103·3 Fah.; highest registered 104°·5, lowest maximum 102°·2 Fah. The normal is arrived at between the fifteenth and twenty-first days.

In the more severe form we generally find that either intestinal hemorrhage occurs during the course of the case, or that we have to deal with a low form of pneumonia, which is a frequent complication, and one which not uncommonly is the immediate cause of death at an advanced period of the fever.

In these protracted cases we get, towards the later stages, dilated pupils, a tongue which is either covered with brownish black fur, and dry, or one which has its central surface glazed, edges and tip red. In both of these transverse furrows may generally be observed. Subsultus and tremors may also be met with, but very rarely floccitatio; delirium, usually of a low form, is pretty constant at night, but rarely present during the day.

In such cases which terminate favourably the temperature reaches its maximum between the nineteenth and twenty-first days, the average maximum is 104°·1 Fah.; highest registered 105°·2, lowest maximum 103°·8 Fah. The normal is reached usually between the twenty-third and thirty-fifth days.

In typhoid fever a high range within the first fourteen days generally foretels a severe and protracted case, but a low range during this period does not necessarily foreshow a mild case, even if the general symptoms be also favourable.

A sudden fall of several degrees, especially if occurring in a severe case, about the end of the second week, and without improvement in the general symptoms, is to be considered with

anxiety, such decline being probably due to intestinal hemorrhage, or to the commencement of a state of collapse.

In such an event the pulse, which very likely up to this time may have kept below 100, usually rises suddenly twenty or thirty beats.

In these cases, when the patient does not immediately succumb, the fall in temperature and rise of pulse are frequently followed, within the next twenty-four hours, by opposite phenomena, the temperature rising higher than the point at which it previously stood whilst the pulse falls considerably.

Again, if we meet with a case in which the general symptoms continue severe, but the temperature, although an abnormal one, fluctuates for some days at a point disproportionally low when compared with the general symptoms, we must consider such low range in an unfavourable light rather than the opposite; especially ought this behaviour of the temperature to be so interpreted if it occur in a case of which the date of the commencement of the fever is unknown or doubtful, and in which the period may then be as late as the end of the third or the fourth week.

Almost without exception in cases which terminate favourably, we find that the general symptoms reach their normal, if I may so speak, several days before the temperature; and although until all fluctuations of the temperature above "the normal" have ceased, the patient cannot be considered safe from liability to a relapse, and great care must be still taken with his diet; yet we may expect in the majority of cases, that if the general symptoms have thus improved we shall have a favourable issue, notwithstanding the slight fluctuation of the temperature above "the normal."

It is the knowledge of this fact that causes us to look with suspicion on cases in which the normal temperature is apparently about to be arrived at before the improvement in the general symptoms.

Fatal cases often exhibit a continuous, although often slight, daily rise in temperature for four or more days previous to collapse, and this may occur without any corresponding alteration in the pulse, or without any decided change in the general symptoms. Now as we know that a continuous rise for four or more successive days is not met with generally in cases which end favourably, such a rise should put us on our guard.

In typhoid fever the pulse, to a considerable extent, fluctuates with the temperature, although the exceptions to this rule are much more frequent than in typhus.

However, generally speaking, an alteration of about five beats of the pulse occurs with each degree of alteration in the temperature. Thus, a temperature of 99°·5 Fah. will correspond to a pulse of 90; a temperature of 100°·5 with a pulse of 95, and so on.

The range of pulses which may be found in different cases, to correspond to the same degree, is, however, very great; thus, between 102 and 103° Fah. I have met with pulses between 80 and 154.

High pulses in typhoid fever do not often occur in adults, unless there is some considerable thoracic or other complication; and when such cannot be detected, there seems some reason for believing that tubercular deposit in the lungs, or the general state of tuberculosis, is the cause of this phenomenon.

Fatal cases have occurred in 13 per cent of all cases, and the proportion of male to female deaths, in the same number of patients, was as 5 to 4. Death took place on the fifteenth, thirty-fifth, and thirty-sixth days, and also in one case on the sixteenth day, of a relapse; besides these cases, the date of death in another patient could not be ascertained, but it was not earlier than the fifteenth day, and very probably took place at a much more advanced period of the disease.

In these fatal cases death was due either to peritonitis, a low form of pneumonia, or asthenia.

In all there was well marked ulceration of Peyer's glands. A low form of pneumonia was the most common complication, and in several cases the fever commenced with some inflammatory affection of the throat.

Diarrhœa was all but universally present, at some time in the course of the fever, although in many constipation prevailed for the first fortnight. Considerable hemorrhage occurred in four cases. Relapses took place in 12 per cent. of all cases.

I will now conclude by summing up the differences most frequently observed between these two fevers, as far as their pulses and temperatures are concerned.

1st. The maximum temperature attained during the course of either disease, about 2, p.m., is somewhat lower in typhoid than in typhus fever, but a continuous abnormal temperature is of much longer duration in the former than in the latter.

2nd. The defervescence of typhus is regular and continuous, the temperature falling generally about a degree a day, until the normal is reached; whereas in typhoid, the fluctuations from day to day are considerable, and the fall is not a continuous one daily.

3rd. There is a great tendeney in typhus to attain eertain temperatures, and to reach certain points in its eourse, on eertain fixed days. Thus, in the great majority of all eases, a temperature of about 104° Fah. is met with on the seventh day; in a very large per centage the maximum is reached on the seventh or eighth days; "the normal" is generally attained, in mild eases, on the twelfth or thirteenth days; and in more severe ones between the fifteenth and eighteenth days.

In *typhoid* there is no particular temperature generally arrived at on any one day; the maximum may be reached at any time between the seventh and twenty-first days; and "normal" is attained, in mild eases, between the fifteenth and twenty-first days; whilst, in the more severe ones, it may be attained on any day between the twenty-fourth and thirty-fifth.

4th. The pulse is generally less frequent in typhoid; and although in both fevers the pulse usually fluctuates with the temperature (about five beats of pulse corresponding to each degree of alteration in temperature), the frequeney of the pulse in the two, for the same degree of altitude, is different.

Thus, with a temperature of 100°·5 Fah., we generally find an average pulse of about 105 in typhus, but of only 95 in typhoid, and so on; at each degree the pulse being about ten beats more frequent in typhus than in typhoid. Moreover we sometimes meet with a ease of typhoid fever in whieh the pulse very slightly exeeeds "the normal" throughout, but sueh a ease I have not observed in typhus.

5th. In typhus the temperature reaches normal two or three days before the pulse, and the general symptoms often eontinue severe several days after the pulse and temperature are both normal. In these eases, however, if the defervesceneе has been regular, and has oeeurred about the usual period, the ease will terminate favourably, notwithstanding the often very unfavourable eondition of the patient.

In typhoid, on the other hand, as I have before mentioned, the temperature keeps up several days after the general symptoms have been eonsiderably improved, and we must look, with doubt rather than otherwise, on eases in whieh this rule appears about to be broken—that is, on eases in whieh the general symptoms eontinue severe, although the temperature is but little, if any, above "the normal."

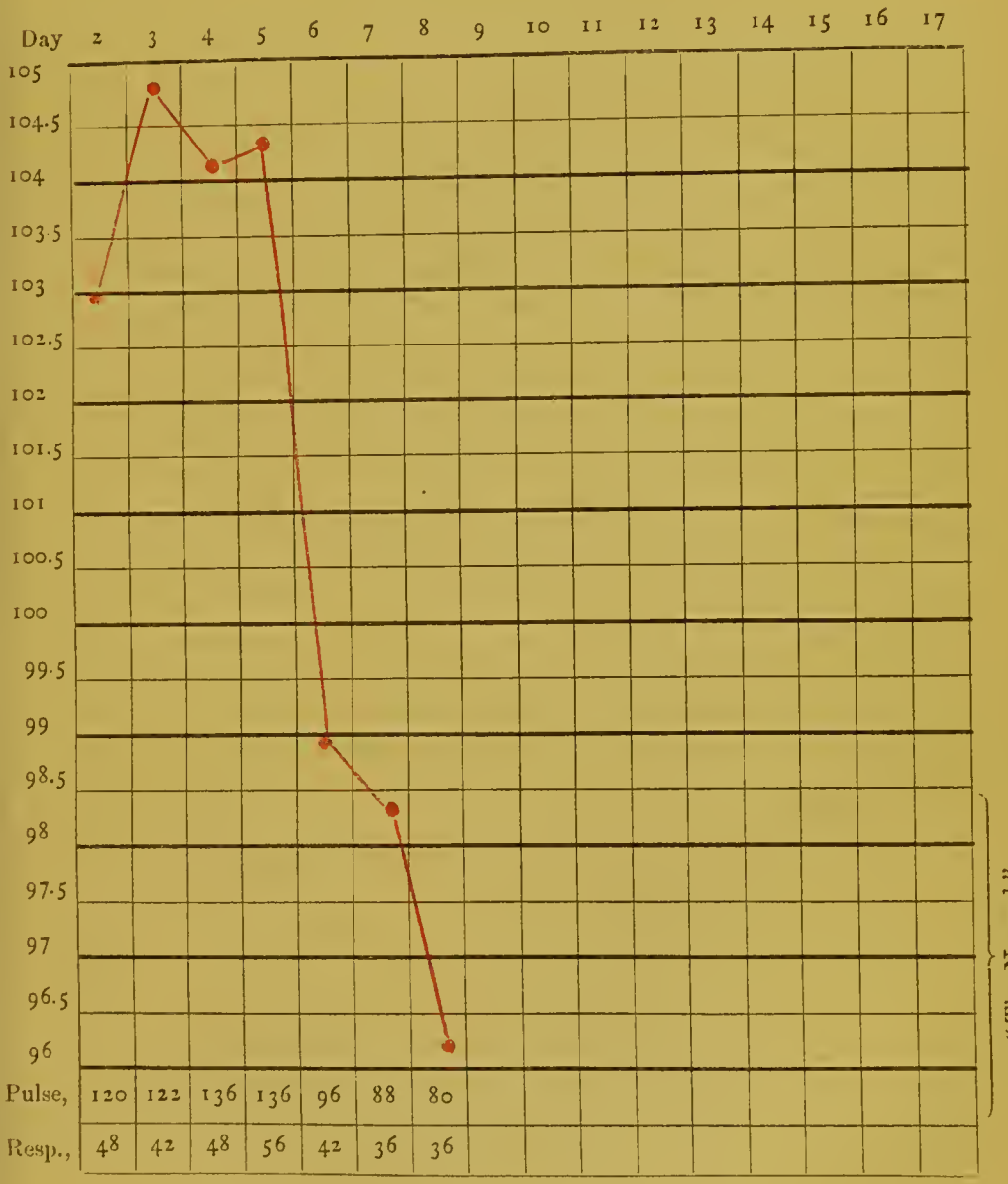
6th. Relapses of typhoid have oeeurred in 12 per eent. of all eases, and in these the temperature ran a somewhat similar course

as in the former attack, although "the normal" was attained at an earlier date.

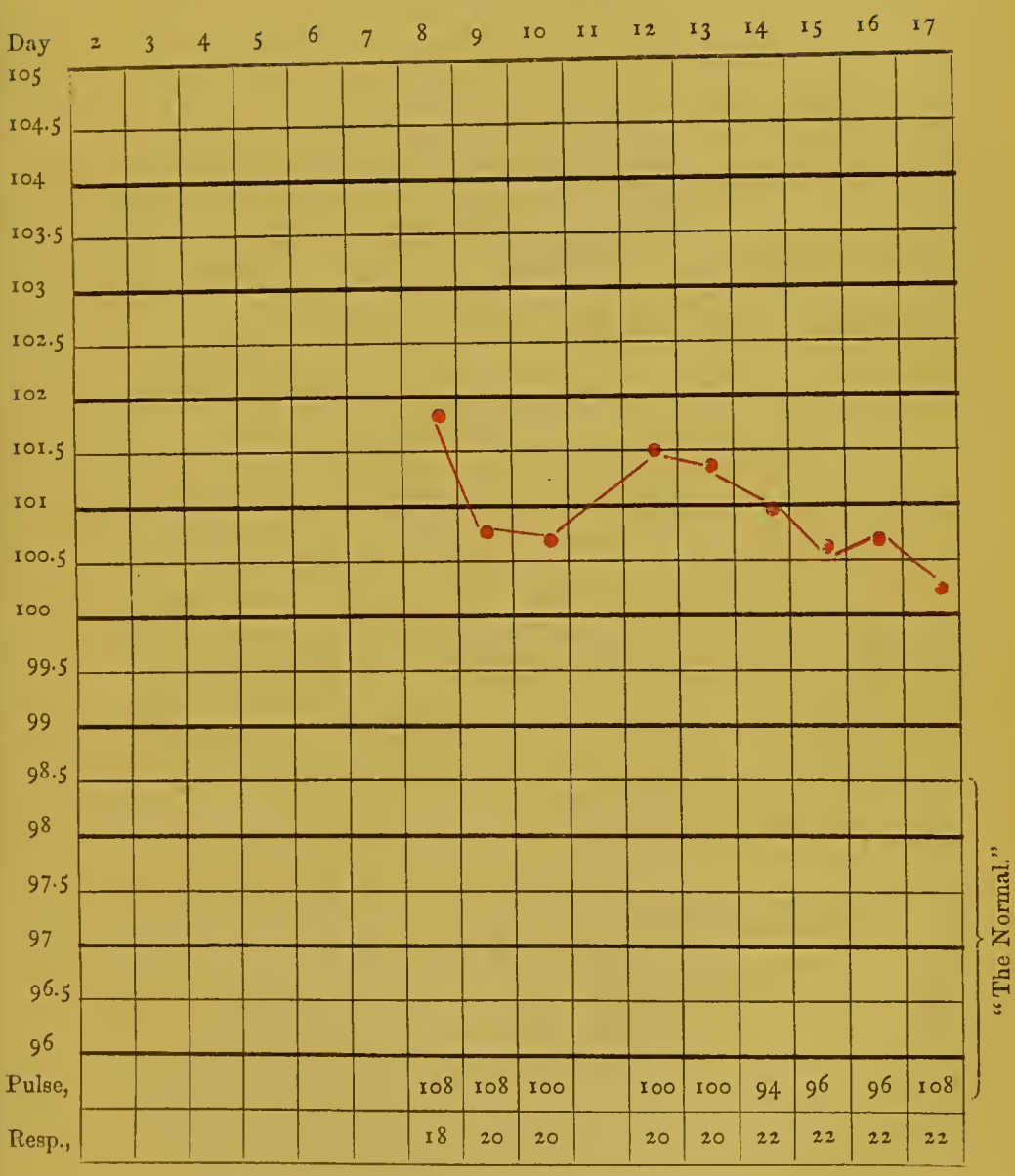
Relapses of typhus, with a corresponding recurrence of abnormal temperature, have never been met with, although the number of cases of typhus under observation has been double that of typhoid.

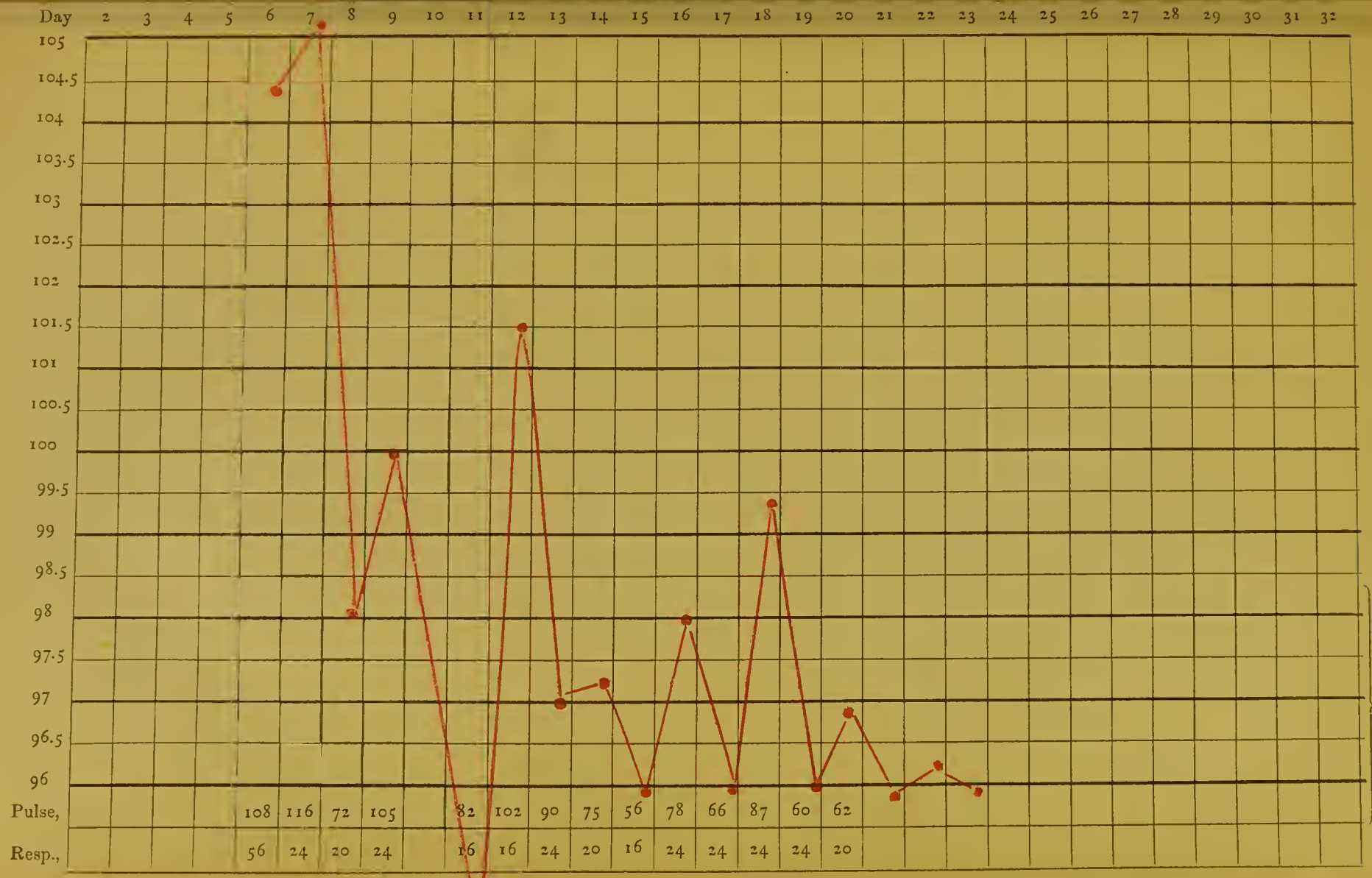
N.B.—The instruments used in these observations were manufactured by the Messrs. Casella (of Hatton Garden, London), whose clinical thermometers can always be depended upon. No reliance can be placed on registrations taken with the ordinary German thermometers as generally imported into this country, as I have found the error in some of them to be as much as 2° Fah. when compared with a standard instrument. English thermometers are, consequently, strongly recommended.

*Female—æt.* 16. PNEUMONIA.



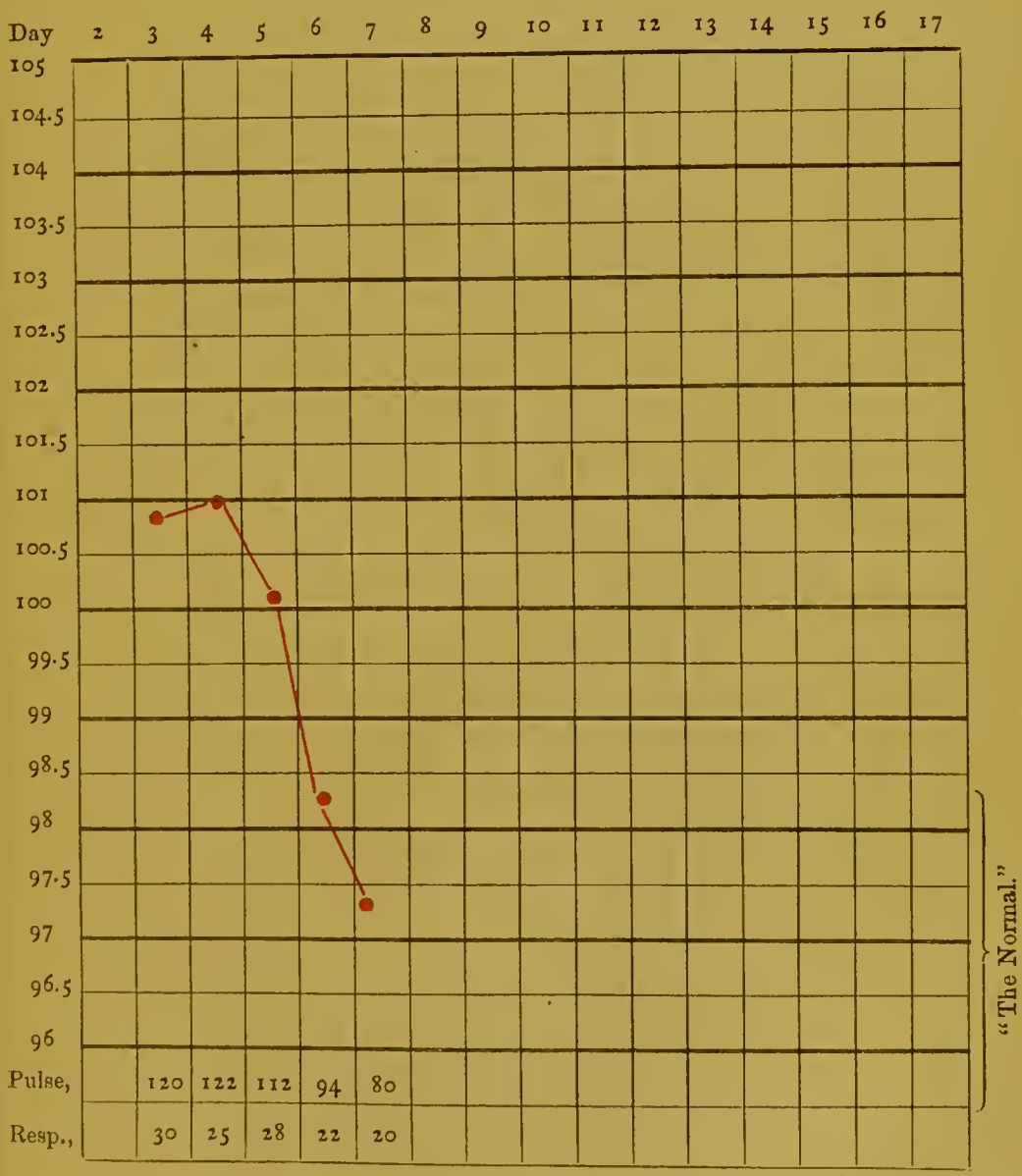
*Female—æt.* 34. ACUTE RHEUMATISM.



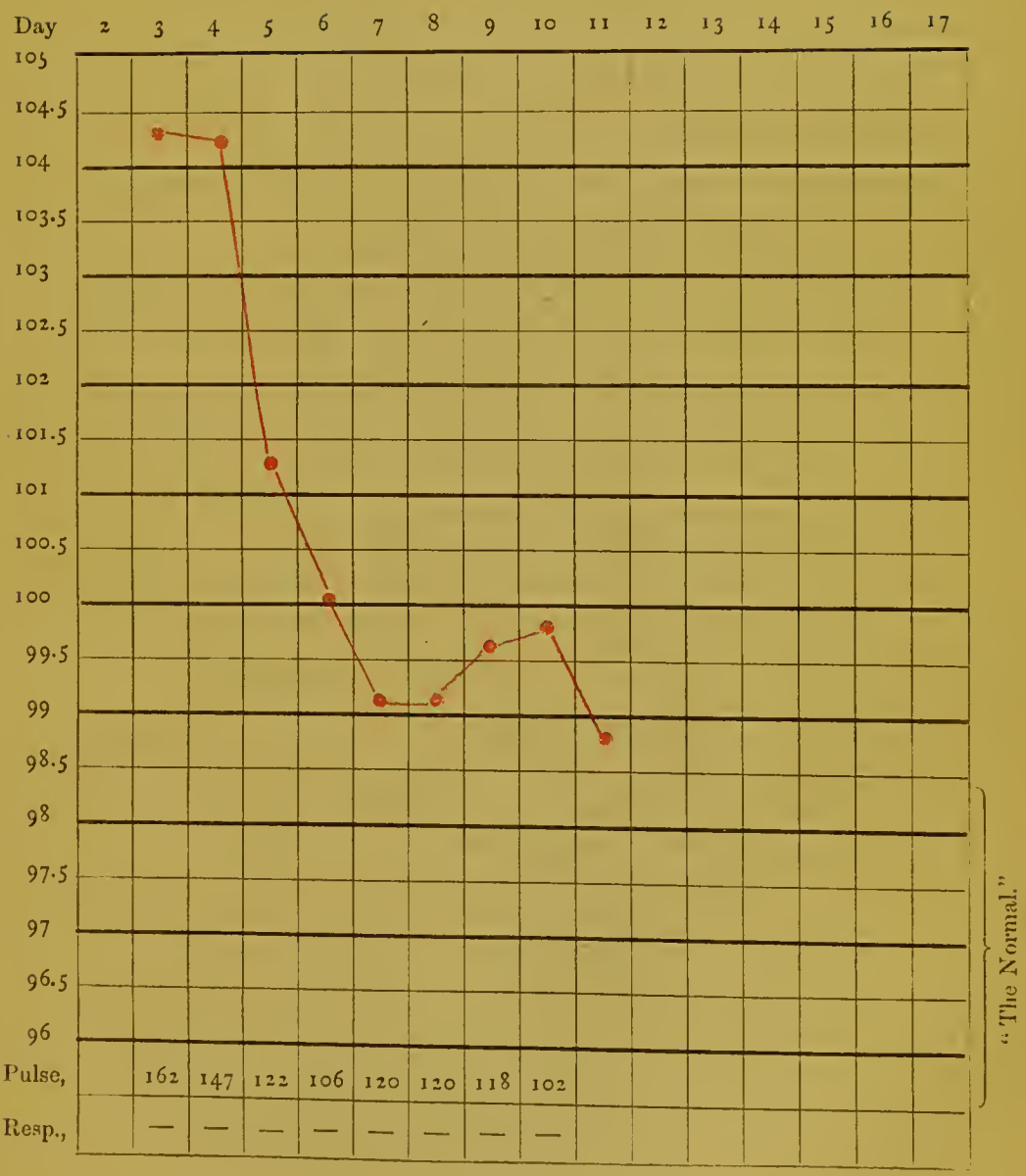

Day 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
105
104.5
104
103.5
103
102.5
102
101.5
101
100.5
100
99.5
99
98.5
98
97.5
97
96.5
96
"The Normal."
Pulse, 108 116 72 105 82 102 90 75 56 78 66 87 60 62
Resp., 56 24 20 24 16 16 24 20 16 24 24 24 24 20

DIAGRAM—III.

*Female—æt.* 16. TONSILLITIS.



*Female—æt. 5.* SCARLET FEVER.



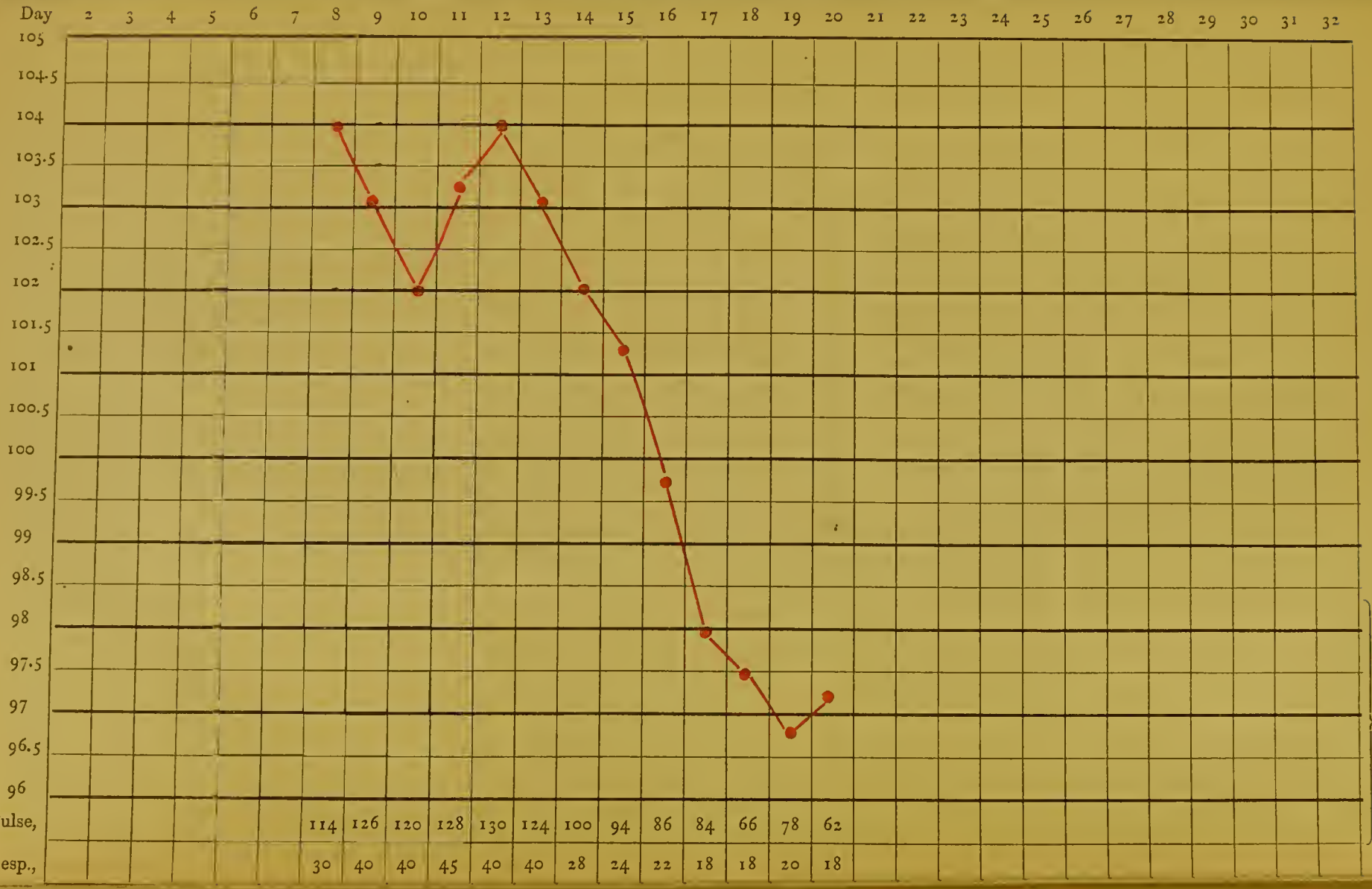
*Female—æt. 18.*

# TYPHUS FEVER—(Mild Form.)


DIAGRAM—VI.

*Male—æt. 21.*

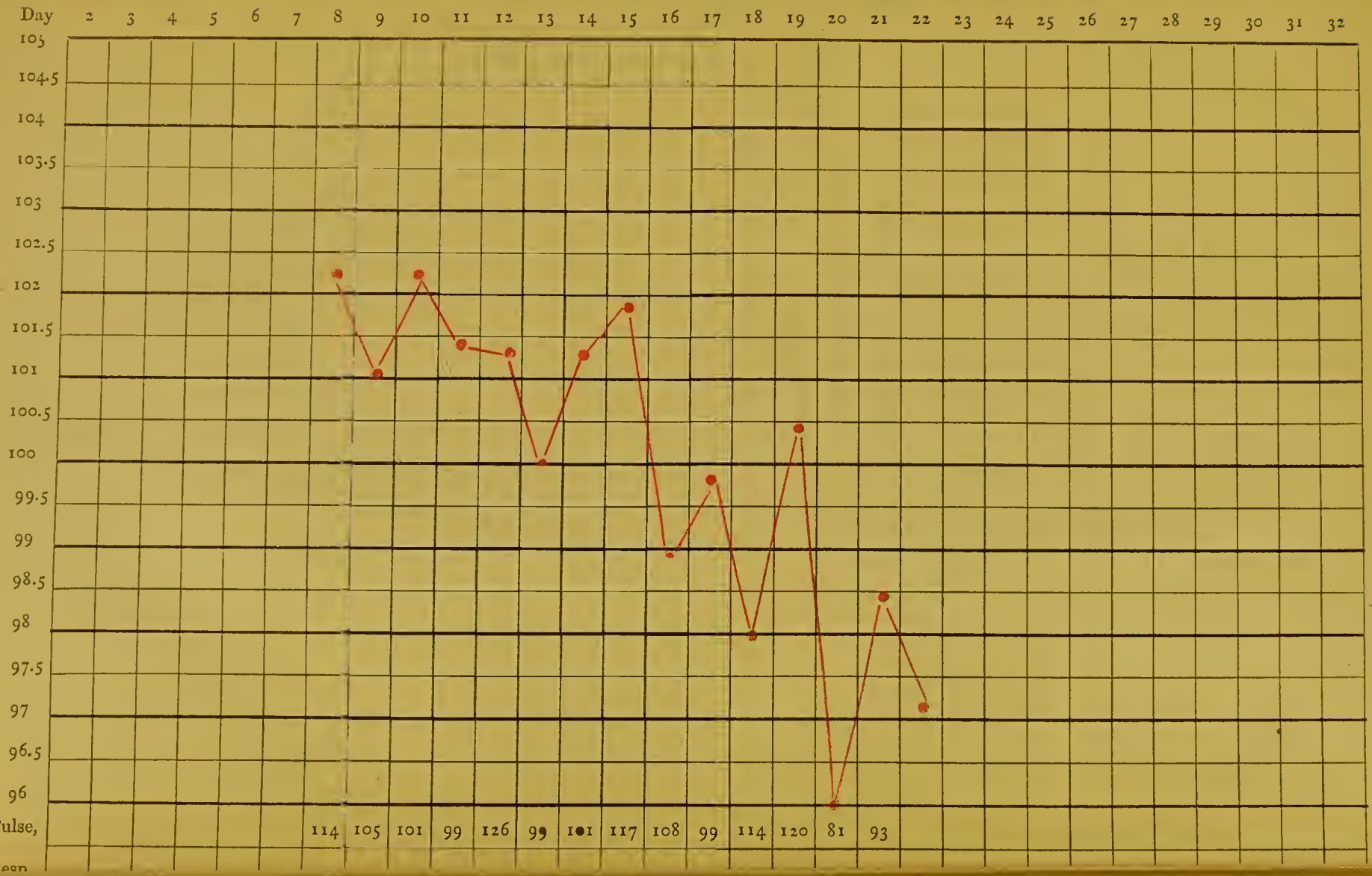
# TYPHUS FEVER—(Severe Form).




DIAGRAM—VII.

*Female—æt. 14.*

# TYPHOID FEVER—(Mild Form).




DIAGRAM—VIII.


Day 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
105
104.5
104
103.5
103
102.5
102
101.5
101
100.5
100
99.5
99
98.5
98
97.5
97
96.5
96
"The Normal."
Pulse, 108 100 96 104 100 110 106 114 108 128 106 96 92 94 96 82 94 86 84 76 88 94 78
Resp., 36 28 36 32 36 32 30 30 40 36 30 34 32 36 34 30 32 36 34 25 30 36 24

With the Author's Compliments